

REMARKS

Claim 31 has been cancelled without prejudice, since the recitations in Claim 31 have been inserted into Claim 30. Claims 2 and 12 have been amended to correct an original typographical error in which some of the claim language was repeated. Claims 7, 17, 25, and 30 have been amended, and new dependent Claims 61 - 65 added in order to more fully claim specific embodiments of applicants' invention. Support for the new dependent claims and the claim amendments to Claims 7, 17, and 25, is found, for example, at Page 22, line 15, through Page 25, line 26, of applicants' Specification as originally filed. Support for the amendment of Claim 30 is found at Page 15, lines 19 - 25 in combination with Page 17, lines 12 - 21 of the Specification, and in original Claim 31.

Applicants are submitting a "Declaration Of Prior Invention" Under 37 C.F.R. § 1.131 to swear behind U.S. Patent No. 6,559,001, the Athavale et al. reference, which is cited under 35 U.S.C. § 102 (e) (2). Applicants' attorney was able to obtain the signatures of four of the five inventors. However, the fifth inventor, Jeng H. Hwang has relocated to Taiwan, and we were unable to obtain a forwarding address, telephone number, or e-mail for him.

Claim Objections

Claims 2 and 12 are objected to due to an informality. In particular, the Examiner observes that, in line 3 of Claims 2 and 12, the term "prior to" is repeated twice. The Examiner suggests deleting one of the occurrences of "prior to". Claims 2 and 12 have been amended in accordance with the Examiner's suggestion, as set forth above.

In light of the amendments to Claims 2 and 12, applicants respectfully request withdrawal of the objections to Claims 2 and 12.

Claim Rejections Under 35 USC § 102

Claims 1 - 4, 6, and 27 - 29 are rejected under 35 USC § 102(e) as being anticipated by U.S. Patent No. 6,559,001, to Athavale et al.

Applicants are submitting a Declaration of Prior Invention Under 37 C.F.R. 1.131, to show invention prior to the effective date of the Athavale et al. reference under 35 U.S.C. § 102(e). Since the reference cited is a patent, the reference would fall under 35 U.S.C. § 102(e)(2), which recites a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent. Applicants' Declaration, with attached supporting evidence, shows that the subject matter disclosed in the Athavale et al. reference was known to the inventors more than 6 months prior to the May 30, 2001 filing date of the Athavale et al. patent application, based on an invention alert for the parent application to the present Continuation-In-Part application.

In view of the removal of the Athavale et al. patent as an effective prior art reference, applicants respectfully request withdrawal of the rejection of Claims 1 - 4, 6, and 27 - 29 under 35 U.S.C. § 102 (e), over the Athavale et al. reference.

Claim Rejections Under 35 USC § 103

Claims 5, 7, and 8 are rejected under 35 USC § 103(a) as being unpatentable over Athavale et al., in view of U.S. Patent No. 5,877,032, to Guinn et al.

The Athavale et al. reference is not citable as an effective reference against applicants' claimed invention, as discussed in detail above, with respect to the rejection of Claims 1 - 4, 6, and 27 - 29 under 35 USC § 102(e).

The Guinn et al. reference does not relate to the seasoning of a plasma etch chamber. Further, the Guinn et al. reference pertains to a process for device fabrication in which a pattern is transferred from a photoresist mask into an underlying layer of silicon dioxide, using a plasma

containing a fluorocarbon gas. The plasma is monitored using optical emission spectroscopy, monitored at selected wavelengths, to effect control of the etch process. (Abstract)

The Guinn et al. reference does not discuss the etching of an iridium layer, and does not mention the presence of involatile etch by-products which cause problems during the etching of subsequent device-containing substrates, as described by applicants. The Guinn et al. reference does not suggest any method of preventing iridium etch byproducts from contaminating substrates subsequently etched in the same process chamber, as claimed by applicants.

There is no common subject matter with respect to the material which is being etched. One skilled in the art will recognize that the problems with the non-volatility of iridium etch byproducts does not exist with respect to the etch byproducts of silicon dioxide, and thus would not use the Guinn et al. reference for guidance as to how to solve the problem which has been solved by applicants' invention.

The Guinn et al. reference does not teach or even suggests applicants' claimed invention. In light of the above, applicants respectfully request withdrawal of the rejection of Claims 5, 7, and 8 under 35 USC § 103(a), over Athavale et al., in view of Guinn et al.

Claims 9 and 10 are rejected under 35 USC § 103(a) as being unpatentable over Athavale et al., in view of U.S. Patent No. 6,090,718, to Soga et al.

The disclosure provided in the Athavale et al. reference is not citable as an effective reference against applicants' claimed invention. This is discussed in detail above, with respect to the rejection of Claims 1 - 4, 6, and 27 - 29 under 35 USC § 102(e).

Applicants respectfully contend that the Soga et al. reference not only does not suggest applicants' invention, but teaches away from applicants' invention. The Soga et al. reference teaches a method of removing reaction product which collects on processing chamber surfaces from previous semiconductor substrate. Applicants teach trapping of the reaction products on the process chamber surface.

In more detail, the Soga et al. reference pertains to a method of cleaning a processing chamber after the performance of a silicon etch process in the chamber “. . . including the steps of etching the silicon substrate, etching a reaction product produced in the step of etching the silicon substrate, and further etching the silicon substrate. Before the step of etching the reaction product, the silicon substrate is taken out from an etching chamber and alternately a dummy substrate is introduced into the etching chamber. The silicon substrate that is etched after the step of etching the reaction product may be a silicon substrate different from the substrate etched before the step of etching the reaction product. A silicon substrate having an SiO<sub>2</sub> layer on a surface thereof can be used as the dummy substrate. Preferably, the step of etching the reaction product includes a cleaning step for etching the reaction product, and a seasoning step for removing the reaction product from the etching chamber and adjusting an atmosphere within the etching chamber and a temperature of the dummy substrate. The cleaning step may further include a first cleaning step performed at a first pressure and a second cleaning step performed at a second pressure different from the first pressure. More preferably, the step of etching the reaction product includes a purge step for removing foreign materials suspended within the etching chamber, attached to the substrate, or the like, without generating plasma within the etching chamber. The purge step can be performed after the seasoning step.” (Col. 3, lines 6 - 32) The Soga et al. reference does not even suggest applicants' invention, which discloses a seasoning method which creates a layer of material on the process chamber surface which entraps and/or adheres non-volatile contaminant particles generated during methal etch processes carried out prior to and subsequent to the seasoning process. Please see, for example, applicants' “Summary of the Invention”, Page 4, lines 20 - 25, continuing at Page 5, lines 1 and 2; and Page 6, lines 9 - 13.

The metal etch particulates described in several of applicants' embodiments are the result of etching a layer of iridium, as described at Page 6, lines 21 - 25.

In light of the above distinctions, applicants respectfully request withdrawal of the rejection of Claims 9 and 10 under 35 USC § 103(a), over Athavale et al., in view of Soga et al.

Claims 11 - 14, 16, 19 - 22, and 24 are rejected under 35 USC § 103(a) as being unpatentable over Athavale et al., in view of Soga et al.

Again, the Athavale et al. reference is not an effective reference against applicants' disclosure. The deficiencies of the disclosure of Soga et al. with respect to the patentability of the present invention are discussed in detail above, with respect to the rejection of Claims 9 and 10 under 35 USC § 103(a). Although Claim 11 pertains to a method of forming a storage capacitor in a plasma etch chamber, it incorporates the elements of seasoning the etch chamber which were discussed with respect to Claims 9 and 10.

Further, the Soga et al. reference pertains to a method of cleaning a processing chamber after etching of a trench in a silicon substrate within the chamber. Soga et al. does not pertain to a method of forming a storage capacitor, in which non-volatile iridium layers are etched, as claimed by applicants. The Soga et al. reference does not teach or even suggest applicants' invention as claimed in Claims 11 - 14, 16, 19 - 22, and 24.

In light of the above, applicants respectfully request withdrawal of the rejection of Claims 11 - 14, 16, 19 - 22, and 24 under 35 USC § 103(a), over Athavale et al., in view of Soga et al.

Claims 15, 17, 18, 23, 25, and 26 are rejected under 35 USC § 103(a) as being unpatentable over Athavale et al., in view of Soga et al., and further in view of Guinn et al.

The Athavale et al. reference is not an effective reference against applicants' disclosure, as discussed in detail above, with respect to the rejection of Claims 1 - 4, 6, and 27 - 29 under 35 USC § 102(e). The deficiencies of the disclosure of Soga et al. with respect to the patentability of the present invention are discussed in detail above, with respect to the rejection of Claims 9 and 10 under 35 USC § 103(a). The deficiencies of the disclosure of Guinn et al. with respect to

the patentability of the present invention are discussed in detail above, with respect to the rejection of Claims 5, 7, and 8 under 35 USC § 103(a).

Even if one were to combine the disclosures of Soga et al. and Guinn et al., one skilled in the art would not be led toward applicants' claimed invention. Whether taken alone or in combination, neither the Soga et al. reference, nor Guinn et al. reference teaches or even suggests applicants' claimed invention.

In light of the above, applicants respectfully request withdrawal of the rejection of Claims 15, 17, 18, 23, 25, and 26 under 35 USC § 103(a), over Athavale et al., in view of Soga et al., and further in view of Guinn et al.

Claims 30 - 37 are rejected under 35 USC § 103(a) as being unpatentable over Athavale et al., in view of U.S. Patent No. 6,350,697, to Richardson et al.

Claims 30 - 37 claim a chamber seasoning method in which a substrate specially designed to provide a source of entrapment or adhering material is disposed within the chamber. The chamber walls, and internal apparatus surfaces of the plasma etch chamber are exposed to a seasoning plasma generated from a source gas that includes at least one principal etchant gas used during a noble metal etch process which produced the nonvolatile etch byproducts which are causing contamination. The plasma-based seasoning process is carried out at a substrate temperature that is equal to or greater than a substrate temperature at which the nonvolatile etch byproducts were produced. Exposure of the substrate to the seasoning plasma generates an entrapment and adhering material which adheres the nonvolatile noble metal etch byproducts to chamber walls and to internal apparatus surfaces.

The Athavale reference is not an effective reference against applicants' disclosure, as discussed above, with respect to the rejection of Claims 1 - 4, 6, and 27 - 29 under 35 USC § 102(e).

Applicants respectfully contend that the Richardson et al. reference teaches away from the use of a special substrate presence during the conditioning of a processing chamber. In the Richardson et al. preferred embodiment, there is no substrate present in the processing chamber until after the conditioning is carried out. In a less preferred embodiment, there is a substrate in the process chamber during conditioning, but it is specifically a production wafer and not a specialized conditioning wafer. (Col. 2, lines 33 - 37.)

All of the embodiments in the Richardson et al. disclosure pertain to the etching of aluminum layers in the process chamber. It is well known in the art that aluminum etch by-products are highly volatile in comparison to the noble metal etch by-products which applicants' seek to alleviate the effect of in their invention as claimed in Claims 30 - 37.

In light of the above, applicants respectfully request withdrawal of the rejection of Claims 30 - 37 under 35 USC § 103(a), over Athavale et al., in view of Richardson et al.

Claims 38 - 51, 56, 57, and 59 are rejected under 35 USC § 103(a) as being unpatentable over U.S. Patent No. 5,411,631, to Hori et al., in view of Athavale et al.

The Athavale et al. et al. reference is not an effective reference with respect to applicants' disclosure, as discussed above.

Applicants respectfully contend that the Hori et al. reference does not render applicants' disclosure obvious. The Hori et al. reference does not relate to and does not even suggest a method of seasoning a process chamber. The Hori et al. reference pertains to a two step method for etching an Al-Si-Cu thin film, where the film is etched by RIE in the first step and etching residues are removed from the etched surface by a sputter effect obtained in a second plasma treatment step. (Abstract and Col. 3, lines 19 - 30) One skilled in the art would not be drawn to the Hori et al. reference with respect to solving applicants' problem related to the build up of noble metal particulates in an etch processing chamber.

Hori et al. does not teach or even suggest a method of seasoning a plasma etch chamber in order to prevent particulates generated from noble metal etch byproducts from adversely affecting an etch process which is subsequently performed in the plasma etch chamber, as disclosed and claimed by applicants.

In light of the above, applicants respectfully request withdrawal of the rejection of Claims 38 - 51, 56, 57, and 59 under 35 USC § 103(a), over Hori et al., in view of Athavale et al.

Claims 52 and 53 are rejected under 35 USC § 103(a) as being unpatentable over Hori et al., in view of Athavale et al., and further in view of Guinn et al.

As previously discussed, the Athavale et al. reference is not an effective reference against applicants' disclosure. The general deficiencies of the disclosure of Guinn et al. with respect to the patentability of the present invention are discussed in detail above, with respect to the rejection of Claims 5, 7, and 8 under 35 USC § 103(a). The general deficiencies of the disclosure of Hori et al. with respect to the patentability of the present invention are discussed in detail above, with respect to the rejection of Claims 38 - 51, 56, 57, and 59 under 35 USC § 103(a).

Claims 52 and 53 depend from independent Claim 48. Applicants maintain that Claims 52 and 53 are patentable over the combination of the Hori et al. and Guinn et al. for the same reasons that Claim 48 is patentable over these references, as discussed above.

In view of the above discussions, applicants respectfully request withdrawal of the rejection of Claims 52 and 53 under 35 USC § 103(a), over Hori et al., in view of Athavale et al., and further in view of Guinn et al.

Claims 54, 55, 58, and 60 are rejected under 35 USC § 103(a) as being unpatentable over Hori et al., in view of Athavale et al., and further in view of U.S. Patent No. 5,789,867, to Westendorp et al.



Claims 54 - 60 relate to particular relative amounts of plasma source gas materials which are used to form a seasoning plasma. These claims depend either directly or indirectly from Claim 48.

The Athavale et al. reference is not a citable effective reference against applicants' disclosure for the reasons previously presented. The deficiencies of the disclosure of Hori et al. with respect to the patentability of the present invention are discussed in detail above, with respect to the rejection of Claims 38 - 51, 56, 57, and 59 under 35 USC § 103(a).

The Westendorp et al. reference pertains to an apparatus and method for improving the ignition of a plasma within a process module. There is no description in the Westendorp et al. reference which relates to process chamber seasoning, or to the etching of noble metal electrodes. The Examiner has cited Westendorp et al. as disclosing a method for igniting plasma comprising the steps of generating a plasma mixture including Cl<sub>2</sub>, N<sub>2</sub>, and argon.

Since the Hori et al. reference does not relate to a method of seasoning a process chamber, and does not discuss the etching of noble metal electrodes, and since the Westendorp et al. reference is not related to this subject matter, a combination of these references does not direct one skilled in the art toward applicants' invention as claimed in Claims 54, 55, 58, and 60. In light of the above, applicants respectfully request withdrawal of the rejection of Claims 54, 55, 58, and 60 under 35 USC § 103(a), over Hori et al., in view of Athavale et al., and further in view of Westendorp et al.

The Examiner is respectfully requested to withdraw the rejection of Claims 54 - 60 under 35 USC § 103(a) as being unpatentable over Hori et al., in view of Athavale et al., and further in view of U.S. Patent No. 5,789,867, to Westendorp et al.

Applicants contend that all presently pending claims are in condition for allowance, and the Examiner is respectfully requested to enter the present amendments and to pass the application to allowance.

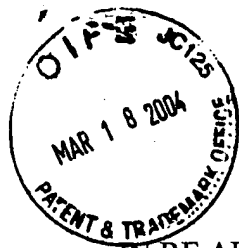
The Examiner is invited to contact applicants' attorney with any questions or suggestions,  
at the telephone number provided below.

Respectfully Submitted,

A handwritten signature in cursive script, reading "Shirley L. Church".

Shirley L. Church  
Registration No. 31,858  
Attorney for Applicants  
(650) 473-9700

Correspondence Address:  
Patent Counsel  
Applied Materials, Inc.  
P.O. Box 450 A  
Santa Clara, CA 95052



U.S. Express Mail No.: ER534273792US  
Attorney Docket No.: AM-5630.P1

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

IN RE APPLICATION OF: Chentsau Ying et al.

SERIAL NO.: 09/991,166

FILED: November 16, 2001

FOR: METHOD OF REDUCING PARTICULATES  
IN A METAL ETCH CHAMBER  
DURING A METAL ETCH PROCESS

§ GROUP ART UNIT: 1765

§

§ EXAMINER: L. Vinh

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§

§

§ Attorney Docket No.:

§ AM-5630.P1

Date: March 18, 2004

**DECLARATION OF PRIOR INVENTION UNDER 37 CFR § 1.131**

Hon. Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This Declaration under 37 CFR § 1.131 accompanies Amendment "A", which is in response to the Office Action mailed November 5, 2003.

We, Yong Deuk Ko, Se Jin Oh, Chang Ouk Jung, Jeng H. Hwang, and Chentsau Ying, hereby declare that we are joint inventors of the invention claimed in U.S. Patent Application Serial No. 09/991,166. We further declare that said invention was conceived and reduced to practice by us prior to May 30, 2001, which is the filing date of U.S. Patent No. 6,559,001 B2, which issued on May 6, 2003.

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**CERTIFICATE OF MAILING UNDER 37 CFR 1.10**

I hereby certify that this paper and any documents said to accompany this paper are being deposited with the U.S. Postal Service on the date shown below with sufficient postage as U.S. EXPRESS MAIL NO. ER534273792US in an envelope addressed to : Mail Stop Amendment (With Fee), Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: March 18, 2004

  
Shirley L. Church, Reg. No. 31,858

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In support of our Declaration, attached is a copy of the Invention Alert which preceded the present patent application. This Invention Alert shows that the invention claimed in the present application was conceived and reduced to practice by us prior to November 21, 2000. Portions of the Invention Alert which pertain to conclusory dates of invention have been dedacted to protect the rights of the inventors.

We, the undersigned, have been warned that willful false statements and the like are punishable by fine or imprisonment, or both, under Sec. 1001 of Title 18 of the United States Code, and further that such willful false statements and the like may jeopardize the validity of the application or document or any registration resulting therefrom, such as a patent issued thereon; and, each declarant declares that all statements made of his/her own knowledge are true; and that all statements made on information and belief are believed to be true.

1) \_\_\_\_\_, 2004

\_\_\_\_\_  
Yong Deuk Ko, Co-inventor

2) \_\_\_\_\_, 2004

\_\_\_\_\_  
Se Jin Oh, Co-inventor

3) \_\_\_\_\_, 2004

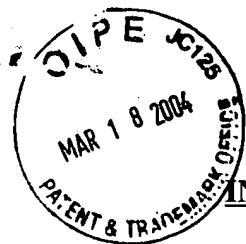
\_\_\_\_\_  
Chan Ouk Jung, Co-inventor

4) \_\_\_\_\_, 2004

\_\_\_\_\_  
Jeng H. Hwang, Co-inventor

5) 3/8, 2004

  
\_\_\_\_\_  
Chentsau Ying Co-inventor



U.S. Express Mail No.: ER534273792US  
Attorney Docket No.: AM-5630.P1

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

IN RE APPLICATION OF: Chentsau Ying et al.

SERIAL NO.: 09/991,166

FILED: November 16, 2001

FOR: METHOD OF REDUCING PARTICULATES  
IN A METAL ETCH CHAMBER  
DURING A METAL ETCH PROCESS

§ GROUP ART UNIT: 1765

§

§ EXAMINER: L. Vinh

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§ Attorney Docket No.:

§ AM-5630.P1

Date: March 18, 2004

**DECLARATION OF PRIOR INVENTION UNDER 37 CFR § 1.131**

Hon. Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This Declaration under 37 CFR § 1.131 accompanies Amendment "A", which is in response to the Office Action mailed November 5, 2003.

We, Yong Deuk Ko, Se Jin Oh, Chang Ouk Jung, Jeng H. Hwang, and Chentsau Ying, hereby declare that we are joint inventors of the invention claimed in U.S. Patent Application Serial No. 09/991,166. We further declare that said invention was conceived and reduced to practice by us prior to May 30, 2001, which is the filing date of U.S. Patent No. 6,559,001 B2, which issued on May 6, 2003.

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**CERTIFICATE OF MAILING UNDER 37 CFR 1.10**

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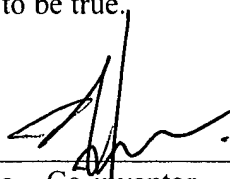
Date: March 18, 2004

  
Shirley L. Church, Reg. No.31,858


In support of our Declaration, attached is a copy of the Invention Alert which preceded the present patent application. This Invention Alert shows that the invention claimed in the present application was conceived and reduced to practice by us prior to November 21, 2000. Portions of the Invention Alert which pertain to conclusory dates of invention have been dedacted to protect the rights of the inventors.

We, the undersigned, being warned that willful false statements and the like are punishable by fine or imprisonment, or both, under Sec. 1001 of Title 18 of the United States Code, and further that such willful false statements and the like may jeopardize the validity of the application or document or any registration resulting therefrom, such as a patent issued thereon; and, each declarant declares that all statements made of his/her own knowledge are true; and that all statements made on information and belief are believed to be true.

1) Nov. 8, 2004

  
\_\_\_\_\_  
Yong Deuk Ko, Co-inventor

2) Mar. 8, 2004

  
\_\_\_\_\_  
Se Jin Oh, Co-inventor

3) Mar. 8, 2004

  
\_\_\_\_\_  
Chan Ouk Jung, Co-inventor

4) \_\_\_\_\_, 2004

\_\_\_\_\_  
Jeng H. Hwang, Co-inventor

5) \_\_\_\_\_, 2004

\_\_\_\_\_  
Chentsau Ying Co-inventor

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INVENTION ALERT FORM

REC'D NOV 27 2000

TO: Gaile Bailey

M/S 2061

Extension:

32724

Current Date: NOV. 21, 2000

ALERT NO:

0005714

→ 5630PI



CIRCLE ONLY ONE APPLICABLE DIVISION AND PRODUCT BUSINESS GROUP(PBG)  
PLEASE SUBMIT ONE ORIGINAL, SIGNED DOCUMENT FOR RECORDING. IF THIS IS A  
COPY OF A PREVIOUSLY SUBMITTED ALERT, PLEASE MARK IT ACCORDINGLY

API	PDB	ETCH	AMD	IBSS	CORE	PRP	MD	AKG	PDC	SOFT-WARE
EPI	KPU1	METAL	ATD	IBSS	CORE TEC	PRP	PVD	ACVD	OPAL	AMIL
HTF	KPU2	SILICON	CORP		PSI		KPU5	APVD	ORBOT	AMJ
RTP	KPU3	HDP			CORE ENG		KPU6	AETCH		
AIT	KPU8	MXP&RPS			PROCOMP		INTE	AHRDWR		
	CTO	COM ENG			CORE KNO					
	CMP	HEXODE			MICRO					

\*Metal Deposition

Please use separate attachments for any answers that don't fit on the form, especially for questions 3-8. If the answer to a question is "NONE", please write "NONE" rather than leaving the answer blank.

1. Title of Invention (please print clearly):

SEASONING METHODS IN HIGH-TEMPERATURE CATHODE DPS  
CHAMBER FOR ETCHING FERAM MATERIALS INCLUDING  
In Pt. PZT IRO<sub>2</sub> TO AVOID PARTICLES DEFECT.

2. Inventors-Names only-(please print clearly and provide complete information at Section 9.)

CHENTSAU (CHRIS) YING  
(JAY) JENG H. HAWONG

RECEIVED  
NOV 27 2000

3. Earliest dates and model names of all Applied products incorporating the invention which have been offered for sale or are expected to be offered for sale:

METAL ETCH DPS CENTURA SYSTEM.

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4. If the invention has been demonstrated or described to persons other than Applied employees, for each disclosure please provide the earliest date, name of company, a brief description of what was disclosed and the purpose of the disclosure. Attach a copy of any related non-disclosure agreements:

[REDACTED]

5. If future disclosures like those in Question #4 are expected to occur within the next 12 months, please provide the anticipated date, type of information to be disclosed, and purpose of the disclosure: NONE [ ]

THE SEASONING PROCEDURE WILL BE DISCLOSED TO ALL  
HIGH-TEMP DPS CUSTOMERS WHICH INCLUDE (POTENTIALLY)

[REDACTED]

THE PURPOSE OF DISCLOSURE IS FOR PARTICLE PREVENTION  
AT INSTALL BASE.

6. Describe any other known designs or processes, whether actually implemented or merely proposed in a publication, which could be considered similar to your invention or which constitute the state-of-the-art improved upon by your invention: If described in a publication, attach a copy of same or provide a citation.

NONE.



7. List each feature of the invention which you consider novel and non-obvious. Describe the advantages of each. Novel feature in comparison with the state-of-the-art approaches which are most similar to your invention:

- ① HIGH  $\text{Cl}_2$  FLOW IN THE SEASONING CHEMISTRY ASSOCIATED WITH  $\text{N}_2$  AND  $\text{Ar}$  GASES.
- ②  $\text{SiO}_2$  WAFER USED AS DUMMY WAFERS
- ③ HIGH CATHODE TEMPERATURE USED (7300C)
- ④ THE SEASONING RECIPE IS DIFFERENT FROM THE ETCHING RECIPE, WHICH IS CONTRARY TO COMMON PRACTICE.

8. Describe the invention, preferably with reference to attached drawings:

- ① THE INVENTION INVOLVED USING THE FOLLOWING RECIPE:  
 $120\text{Cl}_2/30\text{Ar}/15\text{N}_2/20\text{MT}/275\text{Wb}/900\text{WDS}/T_c=350\text{C}/\text{Heat}$   
 TO SEASON THE HIGH-TEMP CATHODE DPS CHAMBER.  
 THE CHAMBER WAS USED TO ETCH FORAM MATERIALS SUCH AS Ir,  $\text{IrO}_2$ , PETA DT.
- ②  $\text{SiO}_2$  WAFERS WERE USED AS DUMMY DURING PLASMA SEASONING FOR THIS CREATING TWO EFFECTS:  
 1) THE METAL/METAL OXIDE PARTICLES CREATED BY ETCHING Ir FOR EXAMPLE COULD REACT WITH  $\text{Cl}_2$ -RICH PLASMA IN A HIGH TEMPERATURE ENVIRONMENT.  
 2)  $\text{SiO}_2$  ETCH BY-PRODUCT USING  $\text{Cl}_2/\text{N}_2/\text{Ar}$  CHEMISTRY - COULD FORM A STICKY LAYER ON THE INTERIOR SURFACE OF THE CHAMBER INCLUDING DOME CAPTURE RINGS, AND CHAMBER WALL, THUS PREVENTING ANY METAL/METAL COMPOUND PARTICLES TO FLAKE OFF CREATING DEFECTS.
- ③ THE RECIPE SHOULD BE USED FOR 30 min RF TIME AFTER CHAMBER WET CLEAN OR 4 MINUTES RF TIME AFTER LONG ATTACH ADDITIONAL SHEETS TO DESCRIBE INVENTION AS NEEDED  
 CHAMBER IDLE TIME UNDER VACUUM.
- ④ DEMONSTRATION AT [REDACTED] HAD SHOWN THAT PARTICLE COUNT DROPPED FROM 7100 TO < 20 ADDERS.

9. Provide the following information for EACH inventor.

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<b>Inventor #1:</b>	
Name: <u>CHEN TSAU (CHRIS) YING</u>	Employee # <u>72961</u> Mail Stop <u>81330</u>
Work Phone <u>408-584-2107</u>	Fax No.: <u>408-584-2660</u>
Job Title: <u>PROCESS MTS</u>	
Citizenship <u>US</u>	
Home Address <u>10370 N. BLANEY AVE CUPERTINO, CA 95014</u>	
Manager: <u>JENG H. HWANG</u>	Title: <u>SR. TECHNOLOGY MANAGER</u>
Div. Manager <u>RALPH KERNS</u>	Title: <u>GM</u>
Product Group: <u>ETCH</u>	Dept #: <u>881</u>

<b>Inventor #2:</b>	
Name: <u>JENG H. HWANG</u>	Employee # <u>47381</u> Mail Stop <u>81330</u>
Work Phone <u>408-584-2109</u>	Fax No.: <u>408-584-2660</u>
Job Title: <u>SR. TECHNOLOGY MANAGER</u>	
Citizenship: <u>US</u>	
Home Address <u>20835 SCOFIELD DR. CUPERTINO, CA 95014</u>	
Manager: <u>STEVE MAK</u>	Title: <u>SR. TECHNOLOGY DIRECTOR</u>
Div. Manager <u>RALPH KERNS</u>	Title: <u>GM</u>
Product Group: <u>ETCH</u>	Dept #: <u>881</u>

<b>Inventor #3:</b>	
Name: _____	Employee # _____ Mail Stop _____
Work Phone _____	Fax No: _____
Job Title: _____	
Citizenship: _____	
Home Address: _____	
Manager _____	Title: _____
Div. Manager _____	Title: _____
Product Group: _____	Dept #: _____

FOR ADDITIONAL INVENTORS, PLEASE COMPLETE AND ATTACH ADDITIONAL SHEET AS NEEDED.

10. Signature, date and PRINTED name of each inventor plus two witnesses who have read and understood this Invention Alert form:

**Inventors:**

CHEN JIAN YING 11/21/00  
Printed Name Date

CHEN JIAN YING  
Signature

JENK H. HAIANG 11/21/00  
Printed Name Date

Jen H. Haiang  
Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

**Witness:**

Zi Xu 11/21/00  
Printed Name Date

Zi Xu  
Signature

Hong Shih 11/22/00  
Printed Name Date

Hong Shih  
Signature

**Return to:** Gaile Bailey  
**Mail Stop:** 2061  
**Fax No.:::** 986-3090  
**Extension:** 563-2724

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Please Verify Title

SA/PJS  
ETCH/Metal  
0881

INVENTION ALERT FORM

INVENTION ALERT FORM

TO: Galle Bailey  
Extension:

20 OCT 16  
M/S 2061  
32724

ALERT NO:

Date:

0005550

CIRCLE ONLY ONE FROM TOP ROW (REQUIRED FIELD):

TCG	CMP	ETCH	OTHER	CPES	ISM	AKT	PDC	FET
IMPLANT/ GATCH 1077	CMP 1399	METAL 0881 0	ISS 0070	CORE ENG 0793	CU WIRE 2492	AKT	APD 2613	FET 3037
IMPLANT/ SWIFT 1755		SILICON 0916	SMD/WMD 1651	ATD 1301	AL WIRE 2492		CDSEM	MDR 3047
SIGEN		DIELECTRIC/RIE 0521	PS/EPIC 2442	FPX 2590	CORE PVD 2492		WF	
ORION 2471		DIELECTRIC/ICP 0521	SCALPEL		LINER/ BARRIER 2492		DRSEM	
EPV SUBSTRATE 2470		CONDUCTOR ETCH TBD	CONSILIUM		W/CVD/ TUNGSTEN 2492		GEMI	
SCP 2512		CHAMBER TECH TBD	HTK		CORE MDVD 2492		ICT	
TPG/RTP 0584		COMMON ENG 1419			ISM-SYS 2492		RT	
TPG/LPVD 0584					ISM-BASE 2492		OSI	
TPG/GATE 0584					ISM SOFTWARE 2492			
TPG/OTHER 0584					HDPVD 0281			
PMD 0195					BLANKET CVD 0166			
					CORE DCVD 2492			
					LOW K 2445			
					ELK			

IF APPROPRIATE - ADDITIONALLY SELECT ONE OF THE FOLLOWING MODULES:

STI					Dual Dam			
CAP		0			CU			
GATE STACK-1498								

Please use separate attachments for any answers that don't fit on the form, especially for questions 3-8. If the answer to a question is "NONE", please write "NONE" rather than leaving the answer blank.

1. Title of Invention (please print clearly):

Particle Radiation by Refs gas addition during Sensing in Cr/P2T/PK.  
New materials Etching process

2. Inventors-Names only-(please print clearly and provide complete information at Section 9.)

YONG DEUK KO / SE JIN OH / CHAN OUK JUNG

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3. Earliest dates and model names of all Applied products incorporating the invention which have been offered for sale or are expected to be offered for sale:

HT DPS SYSTEM

4. If the invention has been demonstrated or described to persons other than Applied employees, for each disclosure please provide the earliest date, name of company, a brief description of what was disclosed and the purpose of the disclosure. Attach a copy of any related non-disclosure agreements:

We applied N<sub>2</sub> gas added seasoning in HT DPS SYSTEM to extend MWPC and to reduce run particle [REDACTED]

5. If future disclosures like those in Question #4 are expected to occur within the next 12 months, please provide the anticipated date, type of information to be disclosed, and purpose of the disclosure: NONE [ ]

At 1Y/PET/DE, New materials etching process must adopt N<sub>2</sub> gas added seasoning to reduce run particle & to extend MWPC. When AMAT sales the HT or DPS system for new materials etching process (DE/PET/1Y, etc), we want to recommend N<sub>2</sub> gas added seasoning to reduce run particle & to extend MWPC.

6. Describe any other known designs or processes, whether actually implemented or merely proposed in a publication, which could be considered similar to your invention or which constitute the state-of-the-art improved upon by your invention: If described in a publication, attach a copy of same or provide a citation.

As I know, no similar invention because this is first time in worldwide base.

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7. List each feature of the invention which you consider novel and non-obvious. Describe the advantages of each novel feature in comparison with the state-of-the-art approaches which are most similar to your invention:

None

8. Describe the invention, preferably with reference to attached drawings:

It seems to be almost physical thing to hypothesize is to, it self  
 No combine with other chemistry or materials. So to particle dropped  
 on the water surface after etching. Run flow is impossible with  
 normal seasoning like ch/or or H<sub>2</sub>O<sub>2</sub>/CH<sub>2</sub>/Ar seasoning. However  
 if body goes add to normal seasoning, run particle decreased dramatically.  
 ATTACH ADDITIONAL SHEETS TO DESCRIBE INVENTION AS NEEDED  
 & MWTC will be increased.

1. CH<sub>2</sub>/O<sub>2</sub>  
 seasoning

1/c check with s: bare wf  
 < 70 cm

etching with 17 pattern or  
 blanket wf  
 > 100 ~ 1.00 cm

no more run flow

3. H<sub>2</sub>O<sub>2</sub>/CH<sub>2</sub>/Ar / 17 al<sub>3</sub> add  
 seasoning

1/c check with s: bare wf  
 < 70 cm

2. H<sub>2</sub>O<sub>2</sub>/CH<sub>2</sub>/Ar  
 seasoning

1/c check with s: bare wf  
 < 70 cm

etching with 17 pattern or  
 blanket wf  
 > 100 ~ 1.00 cm

no more run flow

etching with 17 patterned or  
 blanket wf  
 < 70 cm

run flow possible

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INVENTION ALERT FORM

9. Provide the following information for EACH inventor:

**Inventor #1:**  
 Legal Name: YONG DEUK KO Employee # 65934 Mail Stop 0060  
 Work Phone 011) 559-5912 Fax No.: \_\_\_\_\_  
 Job Title: product spec. asst  
 Citizenship: KOREAN  
 Home Address: 400 NAM JOO-KONG APT 310-1002, OSAN CITY KYUNGDO KOREA.  
 Manager: CHAN OUK JUNG Title: Technologist  
 Div. Manager \_\_\_\_\_ Title: \_\_\_\_\_  
 Product Group: \_\_\_\_\_ Dept #: \_\_\_\_\_

**Inventor #2:**  
 Legal Name: Se JIN OH Employee # 78044 Mail Stop 0061  
 Work Phone 011) 220-2885 Fax No.: \_\_\_\_\_  
 Job Title: ENGINEER  
 Citizenship: KOREAN  
 Home Address: DAIDAEU-INGEDONG 894-1, 203, SUWON, KYUNGDO, KOREA  
 Manager: HONG SUN LEE Title: Plant Manager  
 Div. Manager \_\_\_\_\_ Title: \_\_\_\_\_  
 Product Group: \_\_\_\_\_ Dept #: \_\_\_\_\_

**Inventor #3:**  
 Legal Name: CHAN OUK JUNG Employee # 73826 Mail Stop 0060  
 Work Phone 011) 559-5910 Fax No.: \_\_\_\_\_  
 Job Title: Technologist  
 Citizenship: KOREAN  
 Home Address: 144-2 YANGJAE-DONG L200GUNG APT 105-1203 SEOCHO-KU, SEOUL, KOR  
 Manager: Seh-Kwang Lee Title: Technologist  
 Div. Manager \_\_\_\_\_ Title: \_\_\_\_\_  
 Product Group: \_\_\_\_\_ Dept #: \_\_\_\_\_

# BEST AVAILABLE COPY

INVENTION ALERT FORM

10. Signature, date and **PRINTED** name of each inventor plus two witnesses who have read and understood this Invention Alert form:

## Inventors:

YONG DANK KO  
Printed Name

Oct. 11, 2000  
Date

[Signature]  
Signature

SE JIN OH  
Printed Name

Oct. 11, 2000  
Date

[Signature]  
Signature

CHAN OUK JUNG  
Printed Name

Oct. 11, 2000  
Date

[Signature]  
Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

## Witness:

MONG SUN LEE  
Printed Name

Oct. 11, '00  
Date

[Signature]  
Signature

KYUNG IL YOON  
Printed Name

Oct. 16, 00  
Date

[Signature]  
Signature

Return to:  
Mail Stop:  
Fax No...:  
Extension:

Gaile Bailey  
2061  
986-3090  
563-2724

Add J. Hwang who assisted  
and consulted in Korea  
during development.  
[Signature]